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Systematic Gene Search in the Incyte AffiSeq Database

Tumor tissue
~50,000 individual ESTs

Prostate
Breast
Ovary
Bladder
Uterus

Iterative assembling
with
increasing mismatch

Low

~8,000 contigs
+
~25,000 individual
sequences

~8,000 contigs
+
~25,000 individual
sequences

Comparison of databases

normal tissue-specific
(expected: 100-500)

nonspecifically
expressed genes

tumor tissue-specific
(expected: 100-500)

Genes of Interest

Figure 1

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~50,000 ESTs of a tissue (e.g.: uterus tumor)

GAP4 Assembly 1st Round:
 minimum initial match: 20
 maximum number of inserted
 empty spaces per sequence: 8
 maximum percent mismatch: 0

GAP4 Database 1
 Contigs 1
 Individual sequences 1

unassembled
 ESTs

GAP4 Assembly 2nd Round:
 minimum initial match: 20
 maximum number of inserted
 empty spaces per sequence: 8
 maximum percent mismatch: 1

GAP4 Database 2
 Contigs 2
 Individual sequences 2

unassembled
 ESTs

GAP4 Assembly 3rd Round:
 minimum initial match: 20
 maximum number of inserted
 empty spaces per sequence: 8
 maximum percent mismatch: 2

GAP4 Database 3:
 Contigs 3
 Individual sequences 3

unassembled
 ESTs

Figure 2b1

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Consensus 3

Individual sequences 5

Consensus 4

unassembled
ESTs 5

Consensus 5

GAP4 Assembly 6th Round:
minimum initial match: 20
maximum number of inserted
empty spaces per sequence: 8
maximum percent mismatch: 4

Assembled database
of a specific tissue
(e.g.: uterus tumor)

Figure 2b3

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Assembled database
of a specific tissue
(e.g.: uterus tumor)

Consensus 6

Read-in as individual sequences

Database
of a specific tissue
(e.g.: uterus tumor)

Database of a second
specific tissue
(e.g.: normal uterus)

GAP4 Assembly
minimum initial match: 20
maximum number of inserted
empty spaces per sequence: 8
maximum percent mismatch: 4

Tumor tissue-
specific ESTs

Non-tissue-
specific ESTs

Normal tissue-
specific ESTs

Fig. 2b4

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In silico subtraction of gene expression in various tissues

~30,000 consensus sequences
normal tissue

~30,000 consensus sequences
tumor tissue

Assembly at 4% mismatch

Normal tissue
Specific genes

Cancer tissue
Specific genes

Genes expressed in both tissues

Figure 3

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Genes of interest

Determination of tissue-specific expression
via electronic Northern (INCYTE LifeSeq and
public EST databases)

Candidate genes for tumor suppressors or
tumor activators

Figure 4a

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Partial cDNA sequence
e.g., EST or contig
S

...GCCTCAAGTTATC...

WHILE $C_i > C_{i-1}$

Electronic Northern Blot

Fisher's Exact Test IF H_0 EXIT

Automatic Lengthening

Consensus sequence C

...ATGTCCTAGCCTCAAGTTATCAGATGCAA...

Figure 4b

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Isolation of genomic BAC and PAC clones

Chromosomal clone localization via FISH

Hybridization signal

Sequencing of clones that are located in regions that have
chromosomal deletions in prostate and breast cancer leads to
identification of candidate genes

Exon Intron

Confirmation of candidate genes by screening of
mutations and/or deletions in cancer tissues

Figure 5

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